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Iraq: The Drive To Acquire and Use Advanced Technology

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An Intelligence Assessment



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NESA 86-10004 January 1986

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Iraq: The Drive To Acquire	and
<b>Use Advanced Technology</b>	•

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**An Intelligence Assessment** 

This paper was prepared by Office of	25X1
Near Eastern and South Asian Analysis, with	20/(1
Office of Central Reference. It was	25 <b>X</b> 1 25 <b>X</b> 1
coordinated with the Directorate of Operations.	25X1
Comments and queries are welcome and may be directed to the Chief, Persian Gulf Division, NESA,	
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	Iraq: The Drive To Acquire and Use Advanced Technology	25X1
Key Judgments Information available as of 23 December 1985 was used in this report.	The acquisition and effective use of advanced technology is a key element of Iraq's strategy to develop its economy and counter threats from the more populous Iran. The Iraqis are counting on increased capital investment in industry, including the use of robotics, and expansion of capital-intensive agricultural methods to relieve the economic strains of maintaining one-eighth of its work force in the military and to diversify its oil-based economy.	
	<ul> <li>The Iraqis hope that high technology will enable them to preserve and enhance their strategic advantage over Iran by:</li> <li>Maintaining a decisive military edge in air and ground weapons.</li> <li>Expanding their increasingly sophisticated military industry to reduce dependence on foreign sources—particularly the USSR, which interrupted military supplies early in the Iran-Iraq war.</li> <li>Enhancing their chemical warfare capability.</li> <li>Accelerating efforts to develop nuclear facilities that might support a nuclear weapons program.</li> <li>Despite these efforts, Baghdad's relative edge over Tehran in advanced equipment will erode when Iran rearms after the war.</li> </ul>	
	The Iraqi population's educational level—even though relatively high by regional standards—will limit Iraq's ability to assimilate civilian technology in the near term. Baghdad, therefore, will increasingly stress education, particularly in the sciences. This emphasis probably will raise the level of education substantially above that of Iran and other neighboring states within a generation and give Iraq an edge in the ability to absorb military and civilian technology.	
	Iraq's appetite for Western technology will draw it toward the United States and provide increased opportunities for US business. It will afford the United States only limited opportunities, however, for influencing Iraqi policies. We should expect US-Iraqi ties to be strained occasionally by US denial of Iraqi requests for the transfer of controlled technology, Iraq's illegal acquisition or diversion of that technology, and Iraq's efforts to develop its nuclear and chemical weapons capabilities.	
	Soviet influence in Iraq will decline only slightly as Iraq acquires Western technology. Moscow probably will hope that, by sustaining a major arms supply relationship, it can limit its losses from US commercial gains	

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According to the US Embassy, raising the level of scientific knowledge and technology in Iraq is one of the government's major goals. First Deputy Prime Minister Taha Yasin Ramadan, the regime's economic czar, has said publicly he considers research and development to be the most important ingredients of economic growth. Senior Iraqi officials told a US researcher that Iraq seeks, in particular, to reduce its dependence on oil by creating a multifaceted export economy. Ironically, it was the increases in the price of oil since 1973 that gave Iraq the revenues to begin systematic acquisition of Western technology. Iraq's	Iraqi official told US diplomats last May that Baghdad will feel obliged to compensate the populace for their sacrifices and deprivations during the fighting by increasing imports as well as launching economic development projects.  A critical shortage of labor will plague future Iraqi economic development. Even before the war, the government had to cut back economic development plans because of labor shortages. Until the war ends, Iraq's situation will be even worse: 650,000 men—nearly one-fifth of the male work force—are in the	25X1
dissatisfaction with civilian technology from the Communist countries has accelerated this trend.	military. The 400,000 to 500,000 men that we estimate Iraq will regard as a minimum to defend itself from Iran will comprise about one-eighth of the	25X1
The Iraqis repeatedly cite the need for Western technology in such areas as solar energy, agriculture, food processing, electronic data processing, transport, small and medium-size aircraft, telecommunications, electricity, robotics, and advanced industrial equipment. Since Baghdad restored diplomatic relations with the United States in 1984, Iraqi officials have encouraged increased trade participation by US firms and praised their technology. Iraq has awarded a US firm a contract for a fertilizer plant, sought bids for an oil refinery contract, purchased US computers, and urged US participation in the annual Baghdad Trade	country's 3.6 million economically active males in 1990,  The Iraqis have concluded that technology will offer a partial solution to their labor shortage by increasing productivity. The report of the ninth Ba'th Party congress in June 1982 identified low productivity as one of the most important problems of the 1970s. First Deputy Prime Minister Ramadan headed a symposium of senior economic officials last year that suggested tying wages to productivity and awarding innovators who helped increase and improve	25 <b>X</b> 1
Fair. The Iraqis continue to seek from the United	production.	25X1
States computer hardware and software, telecommunications equipment, a major power plant, a new fertilizer plant, and pipelines, according to the US Embassy.  Relief for the Strained Economy  Officials of the ruling Ba'th Party are counting on technology to help them provide the country with more butter as well as more guns. The Ba'thists pride themselves on the oil-financed economic development	The Iraqis appear to have particularly high—and probably unrealistic, given the shortage of skilled technicians—hopes that robots can alleviate their labor shortages and inefficiencies.  the government plans to establish an institute of production and automation. The institute will be headed by an Iraqi who recently obtained his doctorate in robotics in Japan and will first use Japanese and US robots for machining and assem-	25X1 25X1 25X1

themselves on the oil-financed economic development that has taken place during their rule, but this has slowed because of the war with Iran. Concern over potential internal unrest will increase their desire to

accelerate such development after the war. We believe that most Iraqis expect the economy to resume the rapid growth that the war interrupted. A senior

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study new applications for advanced robots in such

plant facilities.

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fields as underwater oil exploration and nuclear power

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## Supplements to Technology

Baghdad appears to realize that technology alone is insufficient to achieve the goals of countering Iran's numerical advantage in manpower and achieving regional superiority. The government is combining the acquisition of technology with other techniques to increase productivity and sustain economic growth.

Increasing the Birthrate. The government has made increasing, or at least maintaining, Iraq's already high population growth rate a national goal. We doubt that the government actually believes it can substantially increase the birthrate, and it more likely expects only to arrest a probable decline in the rate generated by the war. Although details of the campaign are not yet available, the government already promotes large families by providing subsidized food and free education from primary school through graduate training. According to a US researcher, the government pays parents \$25 per month for the first child and increased amounts for additional children up to \$100 for the 10th.

Greater Female Participation in the Work Force. In contrast to the policies of more conservative Muslim states, Ba'thist secular ideology has long encouraged women to seek education and employment, even though this tends to lower the birthrate. According to the Iraqi press, women comprised 23 percent of the work force in 1983 and constituted 25 percent by late 1985. These figures are among the highest in the Arab world.

The war has accelerated this trend by providing unprecedented employment opportunities for female engineering and medical students—virtually all their male counterparts have entered the armed forces. According to the US Embassy, women comprise nearly all of the workers in many factories and government offices. Iraq's continuing manpower shortage means this trend is likely to outlast the war. The Embassy reports that many Iraqis believe some social barriers have been permanently broken.

Imported Foreign Labor. Iraq has become dependent on foreign labor for construction and manufacturing to alleviate labor shortages in these sectors. Based on press accounts and US Embassy reporting, we estimate that Iraq presently employs more than 1,275,000 foreign workers, mostly Egyptians and Asians, despite a decline of over 30 percent since the war began. This drop stemmed from curtailments in construction projects and new restrictions on workers' remittances to reduce the drain on Iraq's foreign reserves. The Embassy estimates that Egyptians alone remit \$2 billion in hard currency earnings yearly despite the new restrictions.

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More Capitalism. The regime is making significant structural changes in the Iraqi economy to improve productivity. A senior Iraqi official told the US Ambassador last May that President Saddam Husayn wants to move the country away from state socialism and encourage Iraq's small but important private sector. The report of the ninth Ba'th Party congress notes that:

The socialist sector became involved in small and scattered projects that were economically useless. . . . It would have been more useful if . . . the socialist sector devoted itself to projects that required a large capital and a high added value and to strategic projects that would lead to an efficient, quick transfer of technology.

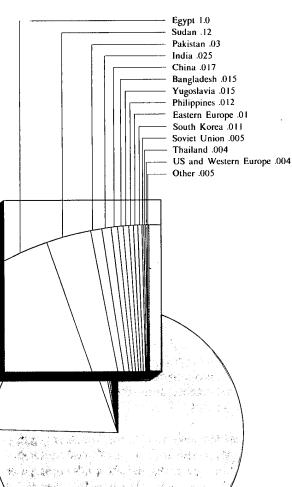
According to Embassy reporting, this trend is already observable. The government passed laws permitting private-sector competition in hospitals and gasoline stations. The Minister of Health explained that private-sector competition would contribute to a better and more efficient national health service. The US Embassy comments that, at a time when government investment is down, the government hopes to channel private-sector wealth, which has grown considerably in recent years, into investment rather than consumption.

# Estimated Iraqi Work Force Breakdown, 1985

Million

307621 1-86

Domestic workers Foreign workers Total: 3.925 Total: 1.275 Egypt 1.0 Sudan .12





Female workers on electronics assembly line

The government places high importance on technology to increase agricultural productivity and reduce Iraq's growing dependence on foreign suppliers for food.

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Iraq's agricultural imports in 1984 amounted to \$3 billion, a substantial drain on the wartime economy. The report of the ninth Ba'th Party congress noted that:

Among the principal objectives we are facing in the coming period is that of ensuring that we produce the food we need. . . . Self-sufficiency in food is no longer a matter of sheer economics; it is now related to questions of national independence and sovereignty, and it will become even more so as the need for food grows in the world.

Iraqi efforts to improve food output are hampered by manpower shortages and the inability of

unsophisticated Iraqi farmers to incorporate scientific

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growing techniques. Moreover, many Iraqi farmers have moved to the cities in search of higher wages and improved standards of living. The government has induced thousands of Egyptian peasants to take their places through offers of free land and aid, but demand	Iran-I Males		y Age (15 t	e <b>o 49</b> ) a	Thousands	
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Baghdad will try	1990	12,182	4,216	7,966	2.89	
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tensive to capital-intensive agricultural techniques.						
he government is investing heavily to develop irriga- on projects and large-scale farms and to increase the						2
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Mutual suspicion will lead both countries to maintain large military forces whether the war ends formally or winds down to a tacit cease-fire. We estimate that Iranian regular and irregular forces will number about 500,000 after the war to counter Iraq's standing army of approximately 450,000 men, which will be about 30 percent larger than before the war.

We believe the Iraqis will try to compensate for their numerical inferiority with an overwhelming material and, especially, technical advantage, particularly in air, armor, and chemical weapons. Baghdad recognizes that to do so will require Western technology, Having reached such conclusions, Iraq has begun to stress the systematic acquisition of Western technology for military purposes, despite a US embargo on arms sales to either side in the Iran-Iraq war and the reluctance of other Western nations to supply advanced weapons to Baghdad.

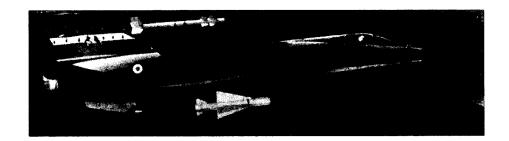
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Mirage F-1



Iraq already has acquired some Western equipment that it has used in the war and is seeking more. French-built Super Etendard and F-1 aircraft armed with Exocet AM-39 missiles have played an important role in Iraqi airstrikes against Iranian oil exports in the Gulf. The Iraqis have also tried—without success—to acquire US 175-mm artillery pieces, Cobra gunships, C-130 transport aircraft, and laserguided bombs,

Expansion of the Military Industry. Iraq's difficulties with its arms suppliers—particularly the USSR, its principal source—have led it to try to reduce its dependence on outside sources for ammunition and spare parts. The Iraqis began to diversify and expand their domestic arms industry after the USSR temporarily curtailed arms shipments during the Kurdish rebellion in the mid-1970s. The Soviets imposed a similar cutoff during the first year of the war with

Even so, we estimate that the

Soviets and their allies continue to supply about 90 percent of Iraq's principal weapon systems, but only about 50 percent of overall deliveries.

Iraq gives the expansion of its indigenous weapons manufacturing capability a high priority. The report of the ninth Ba'th Party congress noted that:

The establishment of such [a national military] industry is necessary for the strengthening of national independence and a free national will. If it is not possible to produce all our armed forces' requirements, then it is possible and necessary to produce the major part of them through national production with emphasis on certain items.

The Iraqis already have expanded their military

industry, which is becoming increasingly sophisticated. In the 1960s and early 1970s, production was largely limited to ammunition and small arms. Since then, the industry has been undergoing rapid development, thanks to increased oil revenues since 1973. the new factories utilize advanced technology, modern equipment, large-scale technical assistance (largely from the USSR and Eastern Europe), and have large production potentials. The Iraqis have constructed factories to produce light and heavy ammunition, Kalashnikov assault rifles, RPG-7 antitank rockets, explosives, and CW agents. Many of the plants are located in the Al Iskandariyah armaments complex, which covers about 100 square kilometers

and is located some 50 kilometers south of Baghdad.

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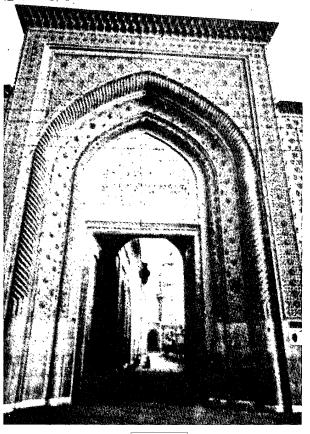
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In our judgment, Baghdad will continue to place particular emphasis on its chemical warfare capability because of the effectiveness of chemical weapons against massed infantry of the sort used by Iran.<sup>2</sup> Iraqi military officers believe that mustard agent halted an Iranian advance in 1983,

and we estimate from press accounts of battles that the use of mustard agent resulted in several thousand Iranian casualties last year. Most observers estimate that Iraq produces up to 6 tons of mustard agent a day. We do not believe that world opinion will deter the Iraqis from seeking more sophisticated nerve agents and delivery systems, although they appear to view chemical weapons as primarily defensive.

Development of a Nuclear Capability. Nuclear arms offer another high-technology option that we believe Iraq will try to develop after the war. Such weapons would provide another deterrent against Iran and Israel and would enhance Iraqi influence, particularly in the Gulf. Moreover, Iraq will be concerned about Iran's potential for developing nuclear weapons.

Iraq's decadelong search for foreign nuclear assistance suggests a long-term desire to acquire a complete nuclear cycle. Major efforts to obtain such aid began in 1974 and appear to have been sparked by India's nuclear test that year, Iran's announced plan to build several nuclear power reactors, and the quadrupling of oil prices, which permitted Baghdad to finance expensive development projects. We do not believe Israel's destruction of Iraq's principal research reactor in 1981 and war-related economic difficulties have dampened Baghdad's interest in enhancing its nuclear capabilities. When the war ends, we anticipate that Iraq will accelerate its efforts to complete a nuclear fuel cycle. Until then, we expect Baghdad to try to exploit the "gray market" to acquire nuclear materials and technology. Iraq, however, is still at



Entrance to Iraqi university

least a decade away from having nuclear facilities capable of supporting weapons development.

### **Emphasis on Education and Research**

The Ba'thists consider education the key to imparting to the work force the technical and scientific skills needed to employ high technology. This view is consistent with the Ba'thists' ideological belief that educated youth have a main role in solving the

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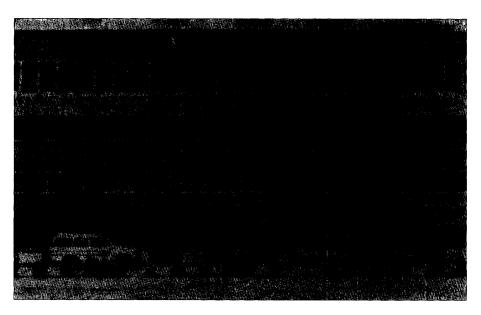
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Council for Scientific Research headquarters



problems of the Arab world and extending Ba'thist influence. The report of the ninth Ba'th Party congress notes that:

The quantity and quality of the manpower base for industry are still below the required standard, and major efforts are needed to upgrade and develop skills. An imbalance in the quantity and quality of middle-level cadres and engineering cadres continues. Modern technology has not been adequately assimilated, and machines and advanced equipment [are beset] by many problems, difficulties, and work stoppages.

According to US diplomats, the Ba'th Party has conducted an ambitious program to expand education since coming to power in 1968. The regime has launched literacy campaigns and made education compulsory. A system of vocational and technical schools has been developed, and students are encouraged to study science. Iraqi engineers have already acquired a regional reputation. Iraq's six universities have a combined enrollment of over 100,000 students, or about one student per 155 Iraqis.

these statistics compare favorably to those of Western Europe in the early 1960s. The number of

students at all levels has more than tripled from 1.3 million in 1968 to over 4 million today, while the population has not even doubled.

This emphasis on education is closely related to a stress on research and development, which the government promotes through several organizations. The US Embassy in Baghdad reports that a Council for Scientific Research, headed by a Western-trained engineer Najih Muhammad Khalil, conducts research at all of Iraq's colleges and universities, with the objective of raising the level of scientific expertise and applying science to Iraq's development program. We believe the research program, with its use of Western technology, helps to dissuade some Iraqi scientists from seeking more challenging work abroad. The council conducts research in building materials, agriculture and water resources, space and astronomy, biology, electronics, solar energy, petroleum, and scientific documentation. The head of the council has ministerial rank, another reflection of the importance Iraq attaches to technology.

## Diversion of Technology

Iraq's drive to acquire Western technology raises questions about its diversion to other parties or uses.

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We believe that Iraqi leaders are determined to gain this technology and have not always been straightforward in acquiring it. Nonetheless, we believe the Iragis would be reluctant to jeopardize their longterm access to Western technology by diverting it to third parties or to unlicensed military use. We have no evidence that Iraq has passed controlled Western technology, particularly hardware, to others. Foreign Minister Tariq Aziz told a former senior US official last May that Baghdad would provide assurances about nondiversion. He also said that, even in the most trying circumstances, Iraq had not strayed from this policy of not diverting technology. Aziz said that US advanced techology is very important to Iraq's development and that Baghdad plans to send more Iraqi university students to join the estimated 1,500 already studying in the United States.

Aziz was tailoring his words in part to suit his audience. We believe Baghdad would be tempted to divert technology to other states if it could not be traced to Iraq or if Iraqi national interests were seriously threatened. If faced with imminent defeat in the war, the Iraqis would allow diversion in return for vital arms. In other circumstances, Baghdad would be unlikely to transfer hardware that is easily detected and whose transfer is not plausibly deniable. The Iraqis might be tempted to reproduce software or manuals that could not be traced to them. Even then, the Iraqis probably would demand large compensation, perhaps more than the market would bear.

We believe internal diversions are more likely than illegal transfers of technology to other states. Baghdad, for example, might give its nuclear scientists or chemical warfare specialists access during off-hours to sophisticated computers in nonmilitary government agencies. There already have been several apparent attempts at diversion:

- L-100 commercial transport aircraft along with the blueprints needed to convert them to C-130 military transports.
- The Iraqis earlier had purchased a civilian version of the Hughes helicopter, which they turned over to the Iraqi Army Aviation Command,

A South Korean official told US diplomats that Iraq had asked Seoul in 1983 to install missile launchers on Hughes helicopters. A Hughes official concluded after visiting Iraq in early 1985, however, that the helicopters were not being used for military purposes.

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- Iraq also tried to outfit two Italian-built civilian helicopters with rocket launchers in 1985, according to a source of the US Embassy in Baghdad.
- In the same year, Iraq asked France to develop an aerosol bomb to spray poisonous liquid from Frenchbuilt helicopters purchased by Iraq,
- The imposition in 1984 of Western controls on the export to Iraq of chemical precursors of CW agents has not stopped Iraqi purchasing efforts.

The Iraqis almost certainly continue to obtain such chemicals from West European sources.

Communist countries will try to obtain Western technology in Iraq even without Baghdad's cooperation.

We estimate there are 1,200 Soviet military personnel and about 34,000 Communist country civilians, including 5,000 Soviets, 12,000 East Europeans, 17,000 Chinese, and 400 Cubans, who are engaged in a wide range of economic and educational activities throughout the country. Even though the Iraqi security apparatus—by most accounts one of the most effective in the Arab world—closely monitors Communist diplomats and military personnel, it is unlikely to follow as closely the activities of Communist country civilians. Iraq's ruthless security services, however, have so instilled in Iraqis the fear of unauthorized contacts with foreigners that Iraq is a hostile operating climate for Communist intelligence officers under any cover.



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### **Prospects**

The Iraqis are likely to achieve mixed results in using Western technology to meet their goals of maintaining military superiority, enhancing regional influence, and promoting economic prosperity. In the short term, they will maintain their advantage over Iran in technology and equipment as long as the West continues its embargo on military equipment to Tehran. In the long term, after the war and the embargo end and as Iran rearms, Iraq will see its relative advantage erode.

Conversely, the acquisition of Western technology will not move Iraq substantially closer to its civilian goals any time soon. The Iraqis will have difficulty assimilating technology because of the limited technical skills and education of the population. The determination and relative efficiency with which Iraqi Ba'thists pursue their goals, however, are likely to transform Iraq's educational system into one of the best-if not the best-in the Arab world. Within a generation these efforts could produce a technological gap between Iraq and its Arab neighbors in the Persian Gulf and would significantly enhance Iraq's political and military influence in the region. The Ba'thists will unabashedly employ this new strength to assert their longstanding claim to regional leadership.

Iraq almost certainly will try to export arms and ammunition once its military industry meets internal needs. Although the Iraqis are unlikely to have much impact on the international arms market, they may provide military hardware to foreign dissidents, some of whom are opposed to US allies. The lower costs of domestically produced arms will make it easier for Baghdad to increase military aid to groups such as Eritrean rebels, Palestinian guerrillas, and Libyan exiles.

### **Implications for the United States**

Iraq's drive to acquire Western technology will lead it toward closer relations with the United States. Baghdad will seek controlled civilian items as well as military equipment and training. Baghdad also will try to discourage close US ties to Iran. The Iraqis will urge Washington not to make major arms sales to Iran that would require similar Iraqi purchases to

maintain Baghdad's military edge. These Iraqi objectives, however, probably will give the United States only limited leverage in encouraging the highly independent Iraqis to moderate their foreign policies.

US business firms are likely to find opportunities to sell a wide range of products and services. In addition to military equipment, US firms can expect considerable interest in computer hardware and software, agrobusiness, consultation in management and employee training, and robotics. Moreover, we anticipate increased enrollment of Iraqi students at US institutions of higher education and additional applicants for US military courses.

Baghdad's quest for US technology will sometimes produce frictions in bilateral relations. The Iraqis will refrain from requesting certain sophisticated military equipment, such as combat aircraft, that they know the United States would refuse or that would provoke the sort of public or Congressional debate that has embarrassed Saudi Arabia and Jordan. Baghdad, however, will expect prompt approval for those items it does request. Delays or frequent refusals probably will lead Iraq's leadership to conclude that Washington is trying to weaken the relationship.

Iraqi enthusiasm for US technology is likely to remain high despite rejections of specific requests. The Iraqis' response to such refusals probably would be to try to circumvent US regulations by obtaining the items through their front organizations that buy from West European firms. Failing this, Iraq would turn to US competitors in Western Europe and Japan.

Iraq's efforts to develop its nuclear and chemical weapon capabilities have the potential to damage relations with the United States. We believe Iraq will accelerate its nuclear development program after the war and will continue to develop and stockpile chemical weapons despite US protests. If Israel made another airstrike on Iraqi nuclear or chemical weapon facilities, the Iraqis would view the United States as an instigator or accomplice.

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The acquisition of Western technology will erode somewhat Soviet influence in Iraq. The Soviets probably will try to limit Western inroads by offering Baghdad newer generations of sophisticated arms. Baghdad will try to exploit the situation to obtain more Soviet technology on better terms. The USSR, however, will retain considerable leverage as Iraq's principal arms supplier. Such influence will be observable more in the positions Iraq takes on issues of concern to the Soviets in the United Nations and Third World forums than in internal Iraqi affairs. The staunchly nationalist Ba'thists have consistently rejected Soviet and other foreign interference inside Iraq.

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